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Studies to develop a method to detect early evidence of radiation damage during the period between October 1, 1965 and March 31, 1966 provided the following data:

1. It was demonstrated that Indocyanine Green removal capacity provides a sensitive index to localized hepatic proton radiation which produces only subcellular damage. Although liver cell damage evoked an increase in Kupffer cell proliferation, there was no change in the removal of  $I^{131}$  albumin which is removed by phagocytes.
2. The sensitivity of Indocyanine Green was increased by giving large doses of the dye. It was found that initial removal of Indocyanine Green increases in a non-linear fashion with the amount of Indocyanine Green given and approaches a maximal value. This is interpreted as indicating Indocyanine Green removal is governed by an active transport process. Maximum initial removal capacity was calculated from a study of clearance of different doses of the dye. This parameter was found to provide an extremely sensitive index to the presence of radiation injury.

These results are interpreted as indicating measurement of Indocyanine Green maximum removal capacity in man may represent an excellent method for detecting early radiation injury. During the process of these basic investigations it was found that the dichromatic ear densitometer provides an accurate and sensitive index to blood levels of Indocyanine Green. This makes it feasible to study Indocyanine Green clearance and maximum removal capacity without resort to blood letting.

Publications during grant period\*

Leevy, C.M., Smith, F., Longueville, J., Paumgartner, G and Howard, M  
Evaluation of hepatic clearance of Indocyanine Green by dichromatic  
ear densitometry, J.A.M.A., in press.

\*Copies will be forwarded at time of publication

Leevy, C.M Observations on the incidence and significance of abnormalities of hepatic DNA synthesis in man, Medicine, in press.

Paumgartner, G., Longueville, J and Leevy, C.M. Phagocytic activity and hepatic function following localized proton radiation to the liver, Aerospace Medicine, in press.

Paumgartner, G , Longueville, J. and Leevy, C.M. Determinants of phagocytosis in liver injury, Proc International Assoc. Study of Liver, Japan.

*Carl Leevy MD.*